Check Dam

Description

Check dams are constructed across drainageways to reduce concentrated flows in the channel and protect vegetation in the early stages of growth. They can consist of stones, sandbags or gravel, and are most commonly used in the bottom of channels that will be stabilized at a later date. Although check dams also collect sediment and hence act as filters, their primary purpose is to reduce erosive velocities.

Other Terms Used to Describe

In-Stream/Channel Energy Dissipators

Pollutants Controlled and Impacts

By reducing runoff velocities in drainageways, check dams reduce the potential for erosion to occur. Although they also help filter sediment, they should in no way replace other Filters, or Sediment Basins.

Application

Land Use
This practice is most commonly used on construction sites and transportation and urban projects.

Soil/Topography/Climate
The proper spacing between check dams is dependent upon the topography (i.e. slope) of the drainageway.

When to Apply
Check dams are to be used when it is not practical to divert flow to a stabilized outlet, or where weather conditions prevent the timely installation of vegetation or non-erosive liners. Apply during the construction of ditches and diversions, and before vegetation is established.

Where to Apply
Apply this practice across drainagways as needed to reduce concentrated flows to non-erosive velocity.

Relationship With Other BMPs

Check dams are often used to help stabilize channels until in-channel vegetation (for Grassed Waterways) is established. They are used during the establishment of other Stormwater Conveyance Channels as well.

Specifications

Design:

1. Check dams are usually used in a series. They should be spaced so that the toe of the upstream dam is at the same elevation as the top of the downstream dam. See exhibit 1.

2. The side slope of the dam should be 2:1 or flatter.

3. The middle of the dam should be 9 inches lower then the outer edges at natural ground elevation. This allows water to flow over the center of the check dam, as opposed to around the sides where it would erode the banks. In areas of heavy flows, additional stone may be needed immediately below the check dam to help dissipate energy and to prevent undercutting of the check dam.

4. Stone size should be increased with increased slope and velocity. The stone should be big enough to stay in place during anticipated high flows. When larger sizes of stone are used, place smaller stones immediately downstream of and adjacent to the check dam to prevent undercutting of the dam.

5. Straw bales are not recommended for use as check dams.

Construction Considerations:

1. Place the stone in the ditch banks and extend it beyond the banks a minimum of 18 inches above the anticipated flow, to avoid washouts from overflow around the dam.

2. The area downstream of the last check dam should be stabilized, or the flow diverted to a Stabilized Outlet.

After Construction:

Temporary check dams may only be removed after the vegetation or permanent lining has been established. Some check dams may remain as permanent structures.
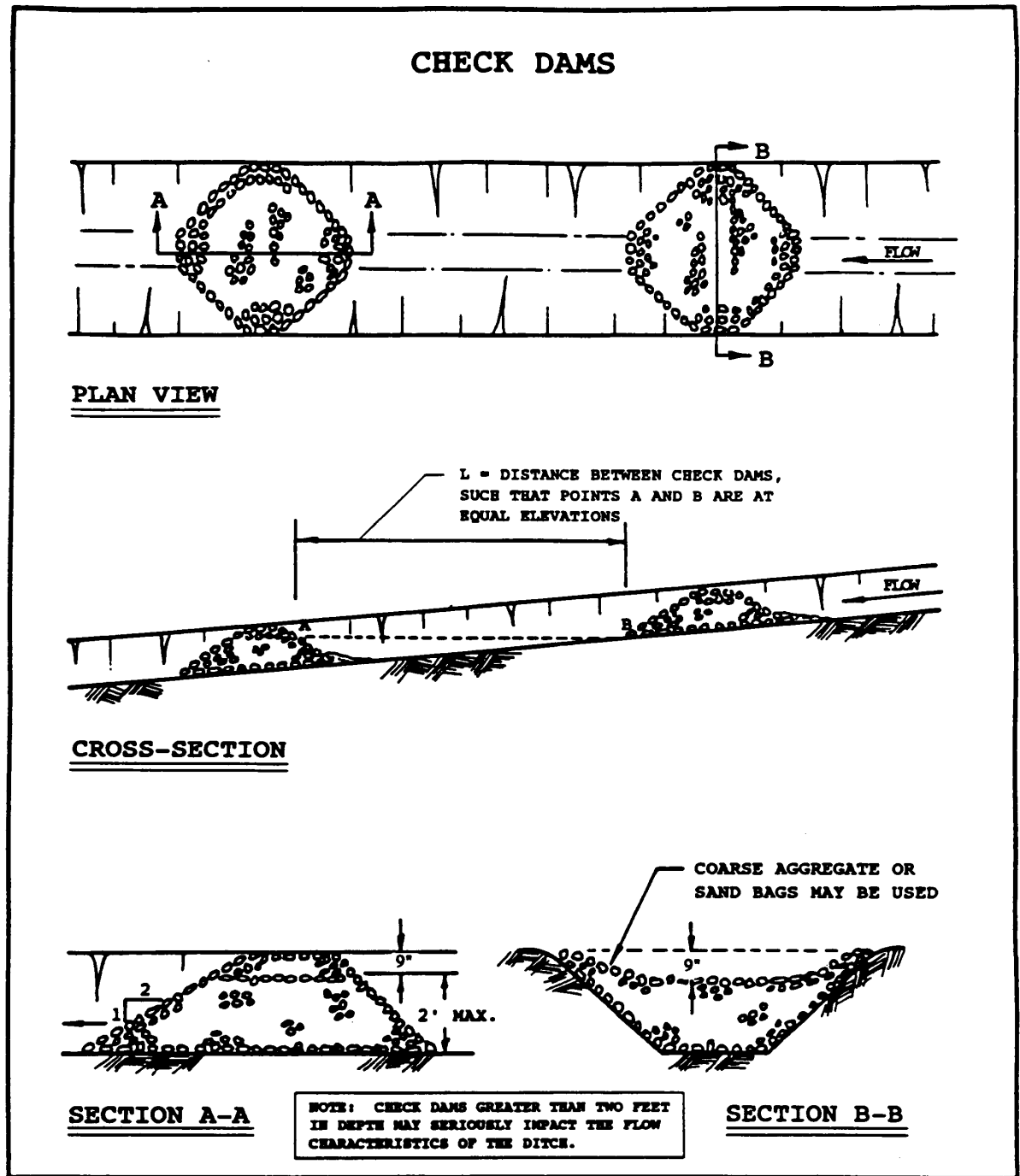
Maintenance

Check dams should be inspected after each rain to ensure there is no piping under the structure or around its banks. Correct all damage immediately. If banks are severely eroded, consider Critical Area Stabilization options. Sediment should be removed when it accumulates to 1/2 the height of the dam, to ensure water can flow through the dam and to prevent large flows from carrying sediment over the dam. That sediment should be placed in the Spoil Pile or other approved upland area.

Add stones as needed to maintain design height and cross section. Also, be sure that culverts and other structures below the check dams are not damaged or blocked due to any displaced stone.

Exhibits

Exhibit 1:   Check Dams. Oakland County (Michigan) Soil Erosion Manual.

Exhibit 1

CHECK DAMS

PLAN VIEW

L = DISTANCE BETWEEN CHECK DAMS, SUCH THAT POINTS A AND B ARE AT EQUAL ELEVATIONS

FLOW

CROSS-SECTION

COARSE AGGREGATE OR SAND BAGS MAY BE USED

9"

9"

2' MAX.

SECTION A-A

NOTE: CHECK DAMS GREATER THAN TWO FEET IN DEPTH MAY SERIOUSLY IMPACT THE FLOW CHARACTERISTICS OF THE DITCH.

SECTION B-B

Source: Modified from the Erosion Control Manual, Oakland County, Michigan.